

# **EXHIBIT A**

**PATENT COOPERATION TREATY**  
**PCT**  
**INTERNATIONAL PRELIMINARY EXAMINATION REPORT**  
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>NKT/0974-03</b>	<div style="display: flex; justify-content: space-between;"> <div><b>FOR FURTHER ACTION</b></div> <div>See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).</div> </div>	
International Application No.  <b>PCT/SG2003/000259</b>	International Filing Date (day/month/year)  <b>7 November 2003</b>	Priority Date (day/month/year)  <b>7 November 2003</b>
International Patent Classification (IPC) or national classification and IPC  Int. Cl.  <b>A61C 7/28 (2006.01)</b>		
Applicant  <b>INNOBRACE ORTHODONTICS PTE. LTD. et al</b>		

<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 3 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 14 sheet(s).</p>	<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <li>I <input checked="" type="checkbox"/> Basis of the report</li> <li>II <input type="checkbox"/> Priority</li> <li>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li> <li>IV <input type="checkbox"/> Lack of unity of invention</li> <li>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li>VI <input type="checkbox"/> Certain documents cited</li> <li>VII <input type="checkbox"/> Certain defects in the international application</li> <li>VIII <input type="checkbox"/> Certain observations on the international application</li> </ul>
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Date of submission of the demand <b>1 June 2005</b>	Date of completion of the report <b>24 January 2006</b>
Name and mailing address of the IPEA/AU  <b>AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929</b>	Authorized Officer  <b>KAREN VIOLANTE Telephone No. (02) 6283 7933</b>

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.  
PCT/SG2003/000259

## I. Basis of the report

## 1. With regard to the elements of the international application:\*

- ☐ the international application as originally filed.
- ☒ the description, pages 1-4, as originally filed,  
pages , filed with the demand,  
pages 5-11, received on 19 January 2006 with the letter of 18 January 2006
- ☒ the claims, pages , as originally filed,  
pages , as amended (together with any statement) under Article 19,  
pages , filed with the demand,  
pages 12-14, received on 19 January 2006 with the letter of 18 January 2006
- ☒ the drawings, pages , as originally filed,  
pages , filed with the demand,  
pages 1/4-4/4, received on 19 January 2006 with the letter of 18 January 2006
- ☐ the sequence listing part of the description:  
pages , as originally filed  
pages , filed with the demand  
pages , received on with the letter of

## 2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

## 3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig.

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\*

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SG2003/000259

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement**

Novelty (N)	Claims 1-13	YES
	Claims	NO
Inventive step (IS)	Claims 1-13	YES
	Claims	NO
Industrial applicability (IA)	Claims 1-13	YES
	Claims	NO

**2. Citations and explanations (Rule 70.7)**Novelty (N) Claims 1-13

Claims 1-13 meet the criteria set forth in PCT Article 33(2) for novelty. The prior art published before the priority date does not disclose an orthodontic appliance comprising a base portion, a body portion extending from the base portion and having an archwire receiving means and a first narrowing forming a neck portion with said base portion and provided substantially rear of the archwire receiving means.

The closest art of:

US 5174754

discloses an orthodontic appliance comprising a base portion, a body portion extending from the base portion and having an archwire receiving means and a first narrowing forming a cantilever notch provided on both sides of the archwire slot, but fails to disclose the notch may be provided substantially rear of the archwire receiving means.

Inventive Step (IS) Claims 1-13

Claims 1-13 meet the criteria set out in PCT Article 33(3) with regard to the requirement of Inventive Step because the prior art does not obviously suggest to a person skilled in the art of providing the first narrowing substantially rear of the archwire receiving means.

Industrial Applicability (IA) Claims 1-13

The invention defined in the claims is considered to meet the requirements of Industrial Applicability under Article 33(4) of the PCT because it can be made by, or used in, industry.

APPROVED FOR PCT/PTO 05 MAY 2006

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base or the common general knowledge in the relevant art in Singapore or elsewhere on or before the priority date of the disclosure and claims herein.

An object of the present invention is to provide an improved orthodontic appliance.

- 5 A further object of the present invention is to alleviate at least one disadvantage associated with the prior art.

#### SUMMARY OF THE INVENTION

- The present invention provides, in one aspect, an orthodontic  
10 appliance comprising a base portion adapted for bonding to a surface of a tooth, a body portion extending from the base portion and having an archwire receiving means and a first narrowing forming a neck portion with the base portion and provided substantially rear of the archwire receiving means. The archwire receiving means has a slot substantially adapted to receive a portion  
15 of the archwire and having an opening comprising a narrowing portion which is narrower than the slot.

- In a preferred embodiment, the second narrowing portion is provided along a length and / or opening of the archwire receiving means. Preferably, the second narrowing is provided at at least one point along a length and / or  
20 opening of the archwire receiving means. The second narrowing portion may preferably be at least one protrusion or rib.

- The present invention also provides, in another aspect, a kinematic inversion of the aspect above, in which the orthodontic appliance comprises a base portion adapted for bonding to a surface of a tooth, a body portion  
25 extending from the base portion and having an archwire receiving means and a first narrowing forming a neck portion with the base portion and provided substantially rear of the archwire receiving means, the archwire receiving means having a slot substantially adapted to receive a portion of the archwire and having an opening comprising an enlarged portion which is broader than  
30 the slot. Preferably, the enlarged portion is provided along a length and / or opening of the archwire receiving means, or provided as one or more points

along a length and / or breadth of the archwire receiving means. The enlarged portion may be provided as a protrusion or rib.

In another aspect of the invention, a method is provided for straightening teeth with an orthodontic appliance as aforescribed, including  
5 an orthodontic bracket, comprising the steps of bonding a base portion of the appliance to a surface of a tooth, coupling an archwire to said orthodontic appliance, including placing the archwire proximate an archwire receiving means, and moving the archwire into contact with either a narrowing portion of the archwire receiving means or an enlarged portion of the receiving  
10 means; and pushing said archwire substantially past said narrowing portion or enlarged portion.

Other aspects and preferred aspects are disclosed in the specification and / or defined in the appended claims, forming a part of the description of the invention.

15 In essence, the present invention stems from the desire to provide an orthodontic appliance with a design which is able to accept an orthodontic archwire in which insertion and removal do not require a separate step of ligation. In this regard, the present invention is directed towards an orthodontic appliance, such as a bracket or buccal tube, having features that  
20 represent significant advantages over currently available self-ligating or self-releasing appliances. The body portion and the archwire receiving means of the present appliance is constructed in one piece, has a first narrowing connecting the base to the archwire receiving means being provided substantially rear of the archwire receiving means, is simple to make and  
25 even simpler to use as compared to all existing orthodontic appliances. Essentially a no ligation system is used that obviates the need for a separate step (usually also with separate instruments) to insert and remove archwires from archwire slots of orthodontic appliances. The present invention unlike all self-ligating or self-releasing systems does not require tiny movable parts as  
30 tiny movable parts may fall with prolonged usage in the oral cavity.

In the present invention, the 'narrowing' being an opening in the archwire receiving means referred to may be rendered a number of ways or in

combination with a lobe, projection, knob, ledge, ridge, boss, extension, flange, hump, lump, lip, nib, protrusion, ramp, rib, skirt, tongue, wedge or the like.

In the present invention, the 'narrowing' connection being a portion  
5 connecting the base to the archwire receiving means may be rendered in any suitable manner so as to provide some flex in the operation of the archwire receiving means.

The present invention should not be limited to only the embodiment disclosed. For example, as is contemplated in the present invention, the  
10 'narrowing' opening may be formed in the archwire, and / or be a kinematic inversion of the embodiment disclosed herein for illustrative purposes only. Likewise, the 'narrowing' connection may be formed by a combination of features of the appliance and the archwire receiving means.

The present invention has been found to result in a number of  
15 advantages, such as:

- no tiny movable parts,
- ease of insertion and removal of archwire without the need of additional instruments to move the movable part of the bracket from open to close position and vice versa and
- 20 • simple to make as the body portion and the archwire receiving means of the orthodontic appliance is constructed in one piece.

Further scope of applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while  
25 indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

### 30 BRIEF DESCRIPTION OF THE DRAWINGS

Further disclosure, objects, advantages and aspects of the present application may be better understood by those skilled in the relevant art by

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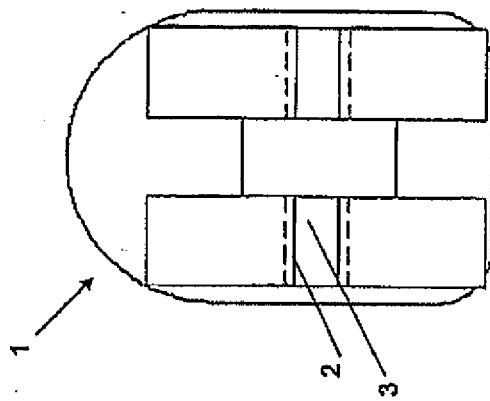


Figure 2

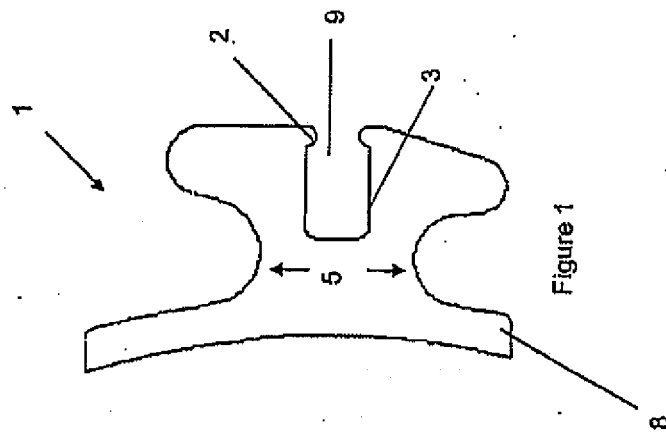


Figure 1



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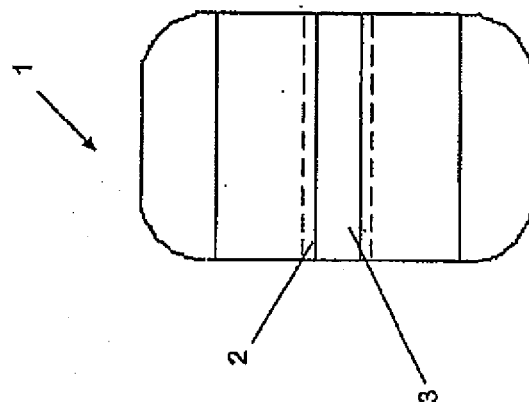


Figure 4

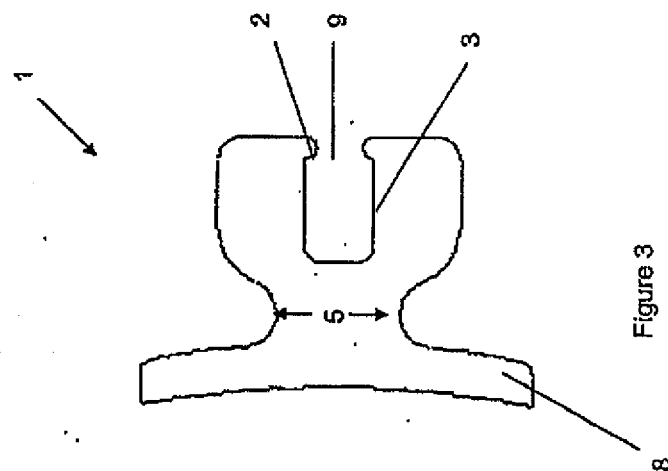


Figure 3

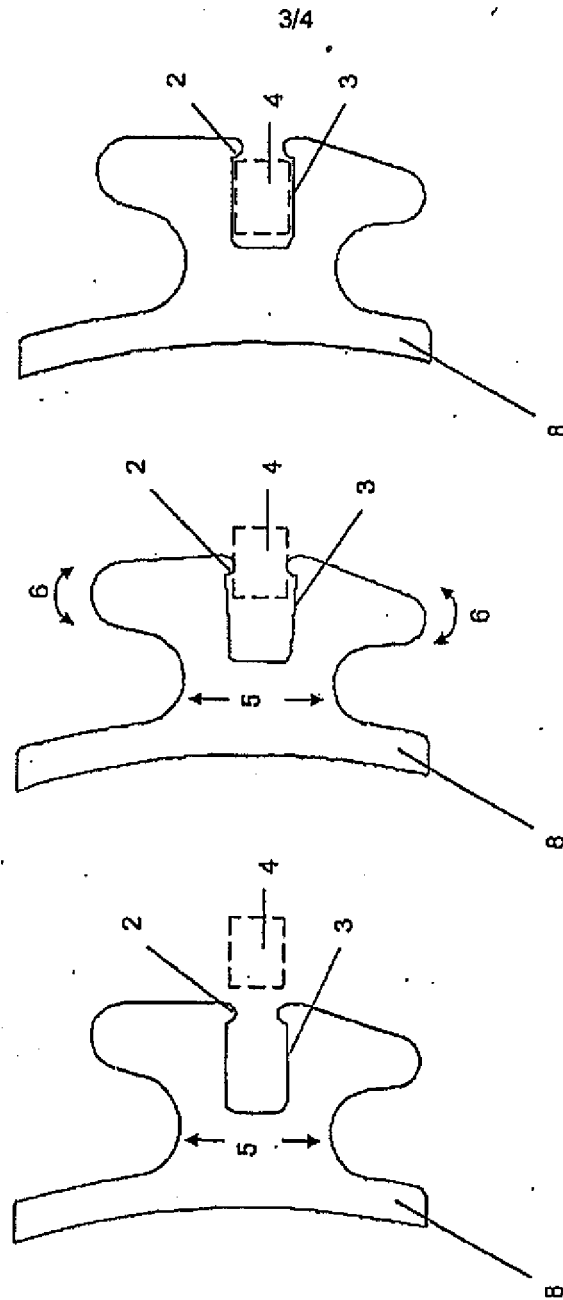


Figure 5

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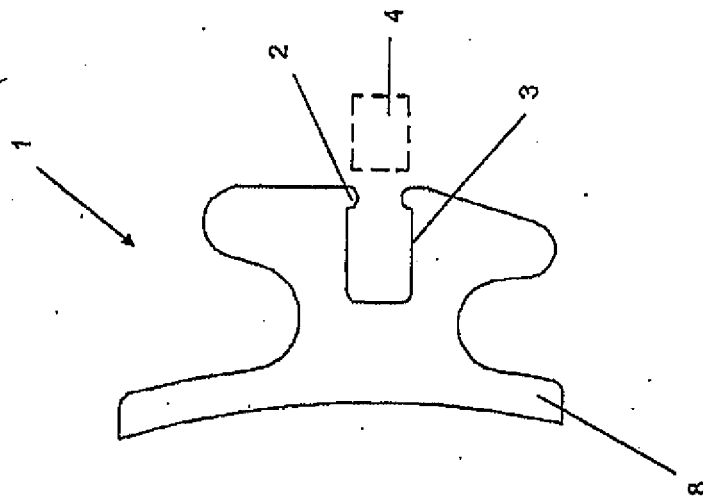
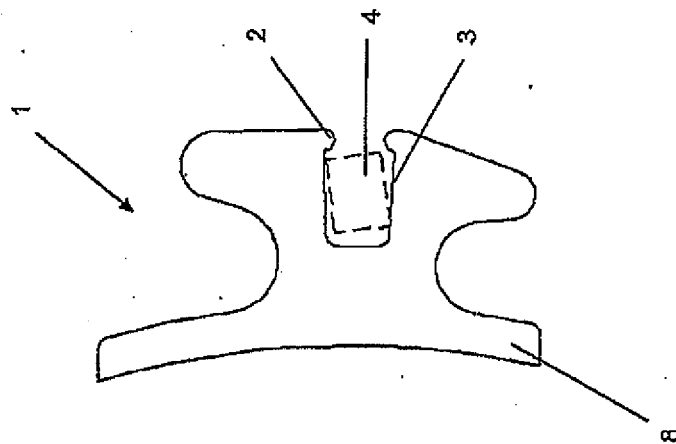


Figure 6